TBD07 – IB SL Question Review #4

Name ……

1. The structures of three vitamins are shown in Table 22 of the Data Booklet.

(a) Predict which of the three vitamins is most soluble in water, giving a reason for your choice.

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(2)

(b) State which **two** vitamins can be classified as primary alcohols.

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(1)

(c) State the function of vitamin D in the human body and describe **one** effect of vitamin D deficiency.

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(2)

(Total 5 marks)

2. (a) The structures of three important vitamins are shown in Table 22 of the Data Booklet. State the name of each one and deduce whether each is water-soluble or fat-soluble, explaining your choices by reference to their structures.

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(5)

(b) Identify the metal ion needed for the maintenance of healthy bones and state the name of the vitamin needed for its uptake.

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(2)

(c) State the name of the vitamin responsible for maintaining healthy eyesight and the name of the functional group which is most common in this vitamin.

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(2)

(d) Identify **one** major function of vitamin C in the human body and state the name of the most common disease caused by deficiency of this vitamin.

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(2)

(e) Fresh fruits and vegetables are good sources of vitamin C. Explain why some meals made from these foods may contain little vitamin C.

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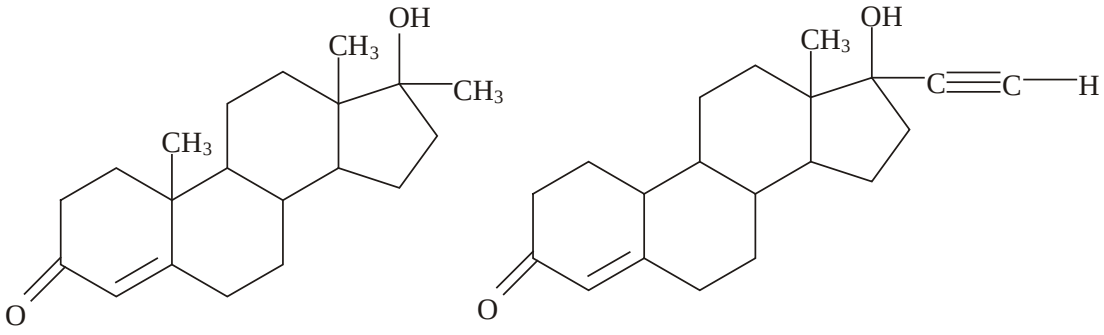
(2)

(Total 13 marks)

3. The structures of two synthetic hormones are shown below:



A **B**

Hormone **A** is similar in structure to testosterone and hormone **B** is similar in structure to progesterone.

(a) Explain why hormone **A** is prescribed to some patients.

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(2)

(b) Suggest why hormone **A** is banned for participants in major sporting events.

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(1)

(c) Describe how hormone **B** functions as an oral contraceptive.

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(2)

(Total 5 marks)

4. Discuss **two** benefits of using genetically modified foods.

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(Total 2 marks)

5. Iodine number is defined as the number of grams of iodine that reacts with 100 g of a triglyceride in an addition reaction. The iodine number of palmitic acid (M_r = 256) is 0 and linolenic acid (M_r = 278) is 274.

Determine the number of double bonds in linolenic acid, showing your working.

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(Total 3 marks)

6. (a) The equilibria, which exist in an aqueous solution of glycine, are shown in the structures below.

$$H_2N\text{-}CH_2\text{-}COO^- \rightleftharpoons H_3N^+\text{-}CH_2\text{-}COO^- \rightleftharpoons H_3N^+\text{-}CH_2\text{-}COOH$$

A **B** **C**

State which of the forms A, B or C occurs in the greatest concentration at:

low pH: .....

high pH: .....

(2)

(b) A mixture of amino acids with different isoelectric points can be separated using electrophoresis.

(i) Outline the essential features of electrophoresis.

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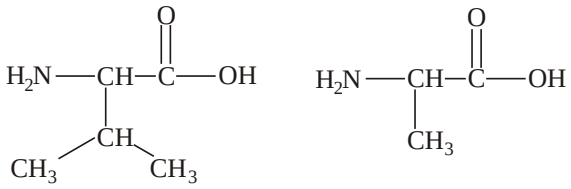
(3)

(ii) Arginine, glutamic acid and glycine undergo electrophoresis at pH 6.0. Using table 20 of the Data Booklet identify the amino acid that moves towards:
the positive electrode: .....
the negative electrode: .....

(2)

(Total 7 marks)

7. (a) (i) Deduce the structure of **one** of the dipeptides that can be formed when the two aminoacids below react together.



(2)

(ii) State the name given to this type of reaction and identify the other product of the reaction.

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(2)

(b) Describe how a mixture of aminoacids can be analysed using electrophoresis.

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(4)

(c) (i) Explain what is meant by the primary structure of proteins.

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(1)

(ii) Explain, with reference to hydrogen bonding, why the □-helix and □-sheet secondary structures of proteins are different.

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(2)

(Total 11 marks)

8. (a) State the name of a disease which results from the deficiency of each of the following vitamins.

vitamin A .....
vitamin B .....
vitamin C .....

(2)

(b) A person consumes an excess of both vitamin A and C. State, with a reason, which **one** is more likely to be stored in the body and which is more likely to be excreted.

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(2)
(Total 4 marks)

9. The structure of lactose, a disaccharide formed from glucose and galactose, is shown in the Data Booklet. Draw the ring structure of galactose and state whether it is an □or □isomer.

(Total 2 marks)